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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/872,458	05/31/2001	Clifford N. Click	SUNMP018	3013

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MARTINE PENILLA & GENCARELLA, LLP  
710 LAKEWAY DRIVE  
SUITE 200  
SUNNYVALE, CA 94085

EXAMINER

KENDALL, CHUCK O

ART UNIT PAPER NUMBER

2192

DATE MAILED: 11/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/872,458

Applicant(s)

CLICK ET AL

Examiner

Chuck O. Kendall

Art Unit

2192

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 06 October 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-6 and 27-38 is/are pending in the application.
- 4a) Of the above claim(s) 7-26 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 27-38 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/06/05 has been entered.

2. Independent claims 27, 31 and 35 have been amended. Claims 1 – 6 and claims 27 – 38 are still pending.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1 – 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawahito et al. USPN 6,519,765 B1 (art of record) in view of Mahadevan et al. USPN 5,797,013 (art made of record).

Regarding claim 1, Kawahito discloses a method for loop optimization within a dynamic compiler system, comprising:

- discovering each index expression within a loop portion (11:57 – 63);

- determining which arrays are accessed using the index expressions (8:15 – 25)

- creating a loop structure using iteration splitting wherein a plurality of loops are generated, each loop of the plurality of loops being based on an original loop structure of the loop portion, and wherein at least one of an upper or lower range check in at least one loop of the loop structure, the loop structure being determined based on the sorted index expressions (2:50 – 60); wherein the creating a loop structure comprises;

- creating a pre-loop structure based on the original loop structure , for indexing expressions, see routine calls; generating a main loop structure having indexing expressions based on the original loop structure, wherein the indexing expressions cannot produce an underflow and creating a post-loop structure based on the original loop structure (1:63 – 2:25), pre-loop structure is capable of testing indexing expressions for underflow and wherein the post-loop structure is capable of testing indexing expressions for overflow (2:10 – 17). Kawahito doesn't explicitly teach for each of the arrays accessed using the index expressions, sorting the index expressions by the trip counter and offset. Mahadevan in an analogous art and similar configuration discloses that various indexes in the loops and sorts them to notice the maximum distance between them (9:33 – 35). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine Kawahito and Mahadevan because, sorting the index expression would enable determining the maximum distance between them and hence make the program more efficient during optimization.

Regarding claim 2, a method as recited in claim 1, wherein the pre-loop structure includes an array boundary test (Kawahito, 12:57 – 63).

Regarding claim 3, a method as recited in claim 2, wherein the post - loop structure includes an array boundary test (for post loop structure see, dividing into three parts and upper bounds, Kawahito, 1:63 – 2:25).

Regarding claim 4, a method as recited in claim 3, wherein the main loop structure does not include an array boundary test (11:39 – 43, see limited to predefined condition).

Regarding claim 5, a method as recited in claim 1, further including the operation of compiling a computer program during execution of the computer program (10:27 – 33).

Regarding claim 6, a method as recited in claim 5, further including the operation of interpreting lines of the computer program during execution of the computer program (10:34 - 37).

Regarding claim 27, which recites similarly to claim 1, see reasoning as previously discussed above.

Regarding claim 28, the method of claim 27 wherein the program is a compiler internal representation of bytecode (10:27 – 30, see bytecode).

Regarding claim 29, the method of claim 28 further comprising transforming the computer program into native executable code (10:30 – 31).

Regarding claim 30, the method of claim 27, wherein the loop structure comprise a pre loop based on the loop portion wherein indexing expressions are boundary tested for underflow only, a main loop based on the loop portion wherein indexing expressions are not boundary tested, and a post loop based on the loop portion wherein indexing expressions are boundary tested for overflow only (1:63 – 2:25).

Regarding claim 31, which recites similarly to claim 1, see reasoning as previously discussed above.

Regarding claim 32, which recites similarly to claim 28, see reasoning as previously discussed above.

Regarding claim 33, which recites similarly to claim 29, see reasoning as previously discussed above.

Regarding claim 34, which recites similarly to claim 30, see reasoning as previously discussed above.

Regarding claim 35, which recites similarly to claim 1, see reasoning as previously discussed above.

Regarding claim 36, which recites similarly to claim 1, see reasoning as previously discussed above.

Regarding claim 37, which recites similarly to claim 28, see reasoning as previously discussed above.

Regarding claim 38, which recites similarly to claim 30, see reasoning as previously discussed above.

### ***Response to Arguments***

5. Applicant's arguments with respect to claims 1 – 6 & 27 - 38 have been considered but are moot in view of the new ground(s) of rejection.

### **Correspondence Information**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chuck Kendall whose telephone number is 571-272-3698. The examiner can normally be reached on 10:00 am - 6:30pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tuan Dam can be reached on 571-272-3695. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

CK.

*Chameli C. Das*  
**CHAMELI C. DAS**  
**PRIMARY EXAMINER**

*10/31/05*